

C L A I M S

1. A method for separating a mixture of fluids into at least two phases, one of which has a higher density than the other, which method comprises:

- passing the mixture through a normally horizontal supply pipe with a feed inlet at its upstream end and an outlet at its downstream end;
- subsequently, passing the mixture through an inclined pipe having an inlet at its upper end that is connected to the outlet of the supply pipe, whilst maintaining a stratified flow in the inclined pipe so that the phase of fluid of lower density ("lighter phase") is above the phase of fluid of higher density ("heavier phase");
- extracting fluid with the lower density via a first discharge system having an inlet that is located such that is in fluid communication with the lighter phase;
- extracting fluid of higher density via a second discharge system located at the inclined pipe and having an inlet that is in fluid communication with the heavier phase;

20 wherein the interface between the lighter phase and the heavier phase is monitored in the inclined pipe by a level controller means that varies the flow of the fluid of higher density to keep the interface between set levels.

25 2. Method, wherein the level controller means comprises a level monitor and a valve at the first and/or second discharge system.

3. Method, wherein the supply pipe is the same as the pipeline conduit through which the mixture to be separated is fed.

4. Method, wherein the fluid of higher density is extracted via a further discharge system having a second outlet that is in fluid communication with the heavier phase.

5 5. Method, wherein the second outlet is arranged in the bottom of the horizontal supply pipe.

6. Method, wherein the pressure of the lighter phase in the first discharge system is monitored, and the flow of fluid of lower density is adjusted in accordance with the 10 pressure measured.

7. Method, wherein the lighter phase comprises oil, and the heavier phase comprises water.

8. Method, wherein three phases are separated into a phase of fluid of lower density ("lighter phase"), a 15 phase with fluid of intermediate density ("intermediate phase") and a phase with fluid of higher density ("heavier phase").

9. Method, wherein the lighter phase comprises gas, the intermediate phase comprises oil and the heavier phase 20 comprises water.

10. Method, wherein the lighter phase and the intermediate phase are withdrawn via the inlet of the first discharge system.

11. Method, wherein the withdrawn phases are passed to a 25 riser section to allow the lighter phase and the intermediate phase to separate.

12. Method, wherein the lighter phase is withdrawn from the riser section at the upper level of the riser section, and the intermediate phase is withdrawn from the 30 riser section at the lower level of the riser section.

13. Method, wherein the riser section comprises two vessels.

14. Method, wherein the interface between the lighter phase and the intermediate phase is monitored by a second 35 level controller means that adjusts the flow of the fluid

of lower density to keep the interface between set levels.

15. Method, wherein the second level controller means communicates with valves that control the flow of the 5 fluid of lower density or the flow of the fluid of intermediate density or both flows.

16. Method, wherein the pressure in the riser section is monitored and the flow of the fluid of lower density, or the flow of fluid of intermediate density or both flows 10 are adjusted in accordance with the pressure measured.

17. A device for separating a mixture of fluids into at least two phases, one of which has a higher density than the other, so that a phase of fluid of lower density ("lighter phase") and a phase of fluid of higher density 15 ("heavier phase") are obtained, which device comprises:

- a normally horizontal supply pipe with a feed inlet at its upstream end and an outlet at its downstream end;
- an inclined pipe having an inlet at its upper end that is connected to the outlet of the supply pipe;
- a first discharge system having an inlet that is located such that is in fluid communication with the lighter phase; and
- a second discharge system located at the inclined pipe and having an inlet that is in fluid communication 20 with the heavier phase,

wherein the inclined pipe is provided with a level controller means comprising a level monitor and a valve at the first and/or second discharge system.

18. Device, which comprises a further discharge system 30 having a second outlet that is in fluid communication with the heavier phase.

19. Device, wherein the second outlet is arranged in the bottom of the horizontal supply pipe.

20. Device, wherein the first discharge system is provided with a pressure monitor that communicates with a flow control valve located in the first discharge system.

21. Device, wherein the first discharge system comprises

5 a riser section to allow the lighter phase and a phase with fluid of intermediate density ("intermediate phase") to separate, which riser section has an outlet for the lighter phase in the upper part and an outlet for the intermediate phase in the lower part.

10 22. Device, wherein the riser section comprises two vessels.

23. Device, wherein the riser section has been provided with a second level controller means that adjusts the flow of the fluid of lower density to keep the interface 15 between set levels.

24. Device, wherein the second level controller means communicates with one or more valves at the respective discharge systems, which valve(s) control(s) the flow of the fluid of lower density or the flow of the fluid of 20 intermediate density or both flows.

25. Device, wherein the riser section is provided with a pressure monitor that communicates with one or more flow control valves for control of the flow of the fluid of lower density, or the flow of fluid of intermediate 25 density or both flows.